

FORMATION OF TERNARY NANO-COMPLEX GOLD NANOPARTICLES-COPPER IONS-HISTAMINE

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The unique properties exhibited by noble-metal nanoparticles, in particular, their spectroscopic properties, make them a useful tool in the analytical field. The possibility of functionalize the nanoparticle surface with chemical moieties such as carboxylic or amine, provides a way to induce the interaction of the nanoparticles with different kind of analytes. The plasmon in the nanoparticles surface presents a resonance band whose maximum wavelength depend on several factors such as size and shape of nanoparticles. Furthermore, it has been described that interparticle distance may also affect the intensity and the position of the surface plasmon resonance band. In some cases, even a new plasmon resonance band may arise when the interaction analyte-nanospheres distort the shape of the nanospecies [1].

Previous works of our research group demonstrate the ability of carboxylic derivatized gold nanoparticles to interact with metal ions such as europium and amine compounds such as lysine [2]. Based on that experience, in this work we describe the interaction of a complex between copper ions and histamine [3] with gold nanoparticles (functionalized with mercaptoundecanoic acid, MUA-GNPs). The modification of the absorption spectra (spectral shifts and absorbance increase/decrease) was used to study the interaction mechanism. In Figure 1 the TEM image and the diameter size histogram of MUA-GNPs are shown. Parameters such as reagents addition order, pH, kinetics, presence and absence of stabilizers were studied. Furthermore, a novel analytical method based on this nano-interaction is outlined for the determination of histamine.

References:

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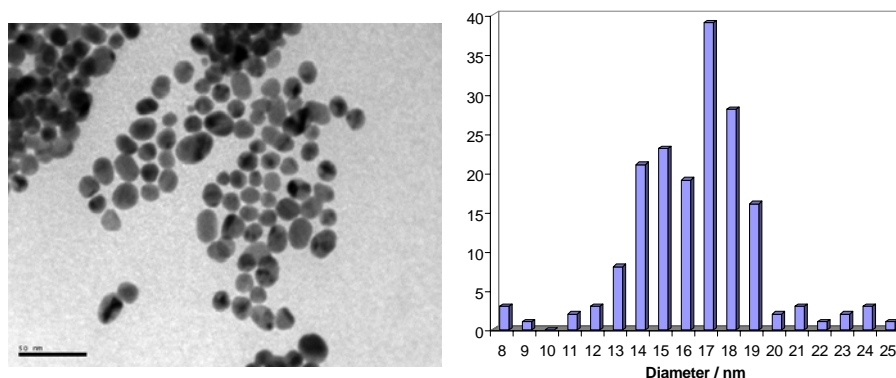


Figure 1- TEM image of MUA-GNPs and size histogram